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•DISCOVER THE GIANTS O REHISTORIC WORLD•

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• DISCOVER THE GIANTS OF THE PREHISTORIC WORLD •

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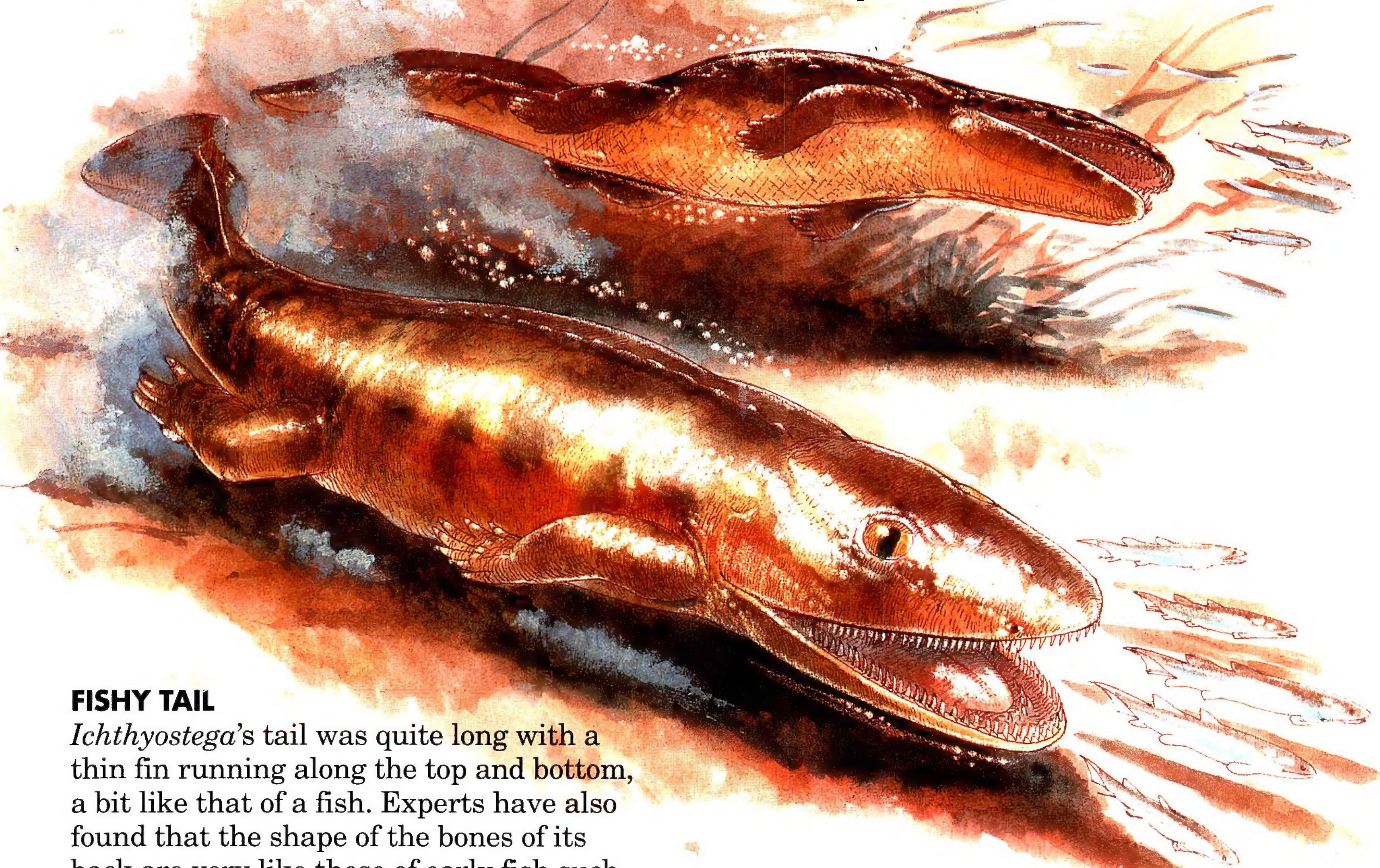
ICHTHYOSTEGA

***Ichthyostega* was one of the first animals to leave the water and walk on four legs.**

About 340 million years ago, before the continents began to drift apart, Greenland was closer to the Equator and the climate there was quite warm. *Ichthyostega* lived in Greenland, and early this century a few skeletons were found.

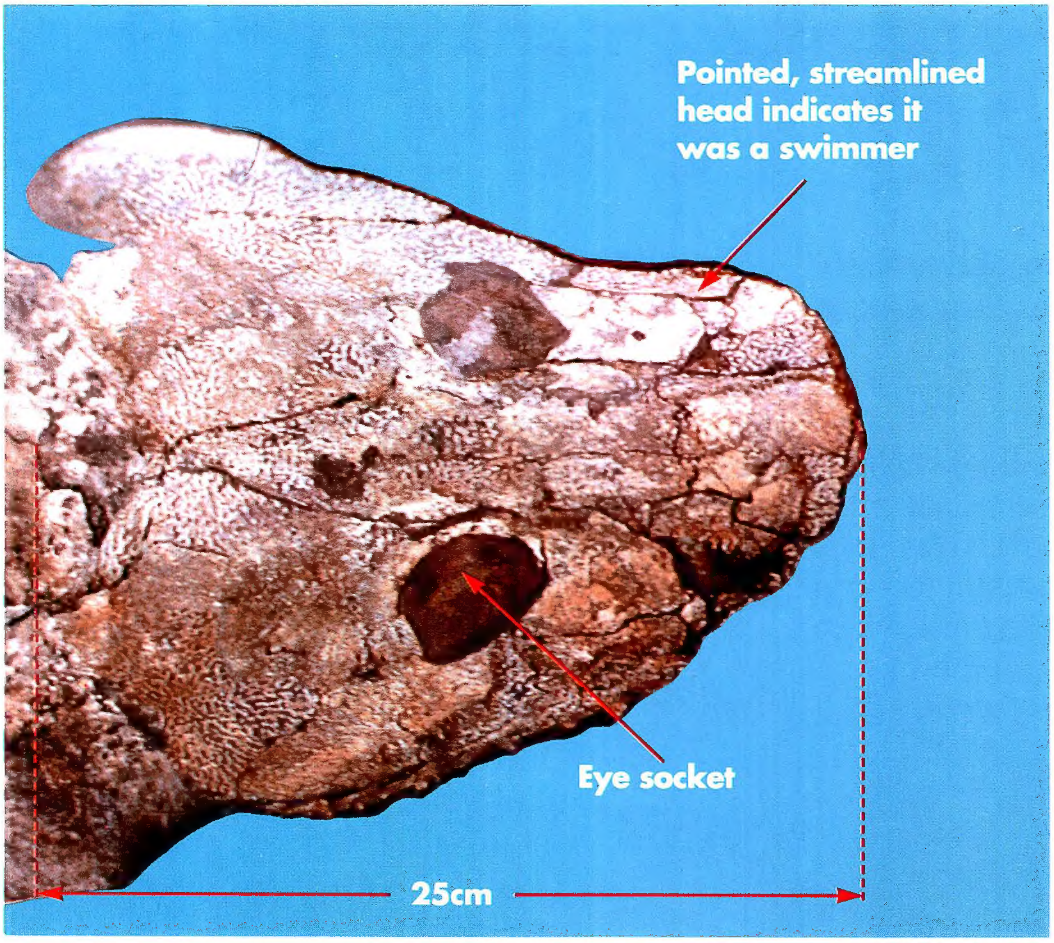
A FISH ON LEGS

This fish-like animal moved slowly on land and kept close to freshwater lakes and rivers where it found plenty of food. *Ichthyostega* was slightly longer than a badger of today. It looked rather like a fish on legs! As well as its fishy tail, *Ichthyostega* had many other features that show links with its fishy ancestors. Its slender, tapering shape was streamlined like the body of a swimmer and its head was low and pointed.



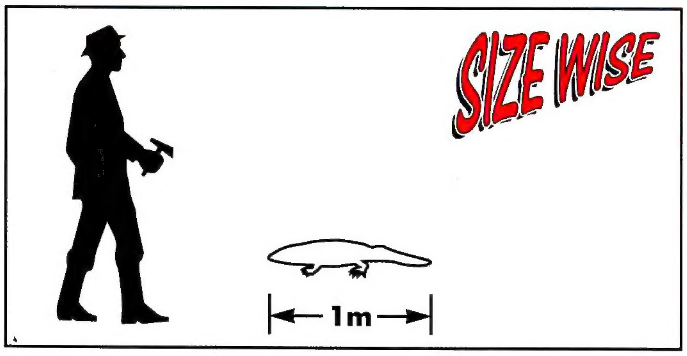
FISHY TAIL

Ichthyostega's tail was quite long with a thin fin running along the top and bottom, a bit like that of a fish. Experts have also found that the shape of the bones of its back are very like those of early fish such as *Eusthenopteron*.



The skull of an *Ichthyostega* (left).

These two *Ichthyostega* have crawled out of the water and lay in wait for a meal. When a fish swims past, one of the amphibians will slide into the water to devour its prey.



MONSTER FACTS

- **NAME:** *Ichthyostega* (ik-thee-o-stee-ga) means 'skull like a fish'
- **GROUP:** amphibian
- **SIZE:** about 1m long
- **FOOD:** fish and occasionally worms
- **LIVED:** about 340 million years ago in the Late Devonian Period in Greenland

FISH OUT OF WATER

As one of the earliest known amphibians, *Ichthyostega* could live on land and swim in water. Experts think that its scaly skin was not very waterproof but it still needed to swim in search of prey. On land, it needed a moist atmosphere in which to survive. As it crawled along the shore, a glimpse of a darting fish was likely to tempt it into shallow waters.

WIDE MOUTH

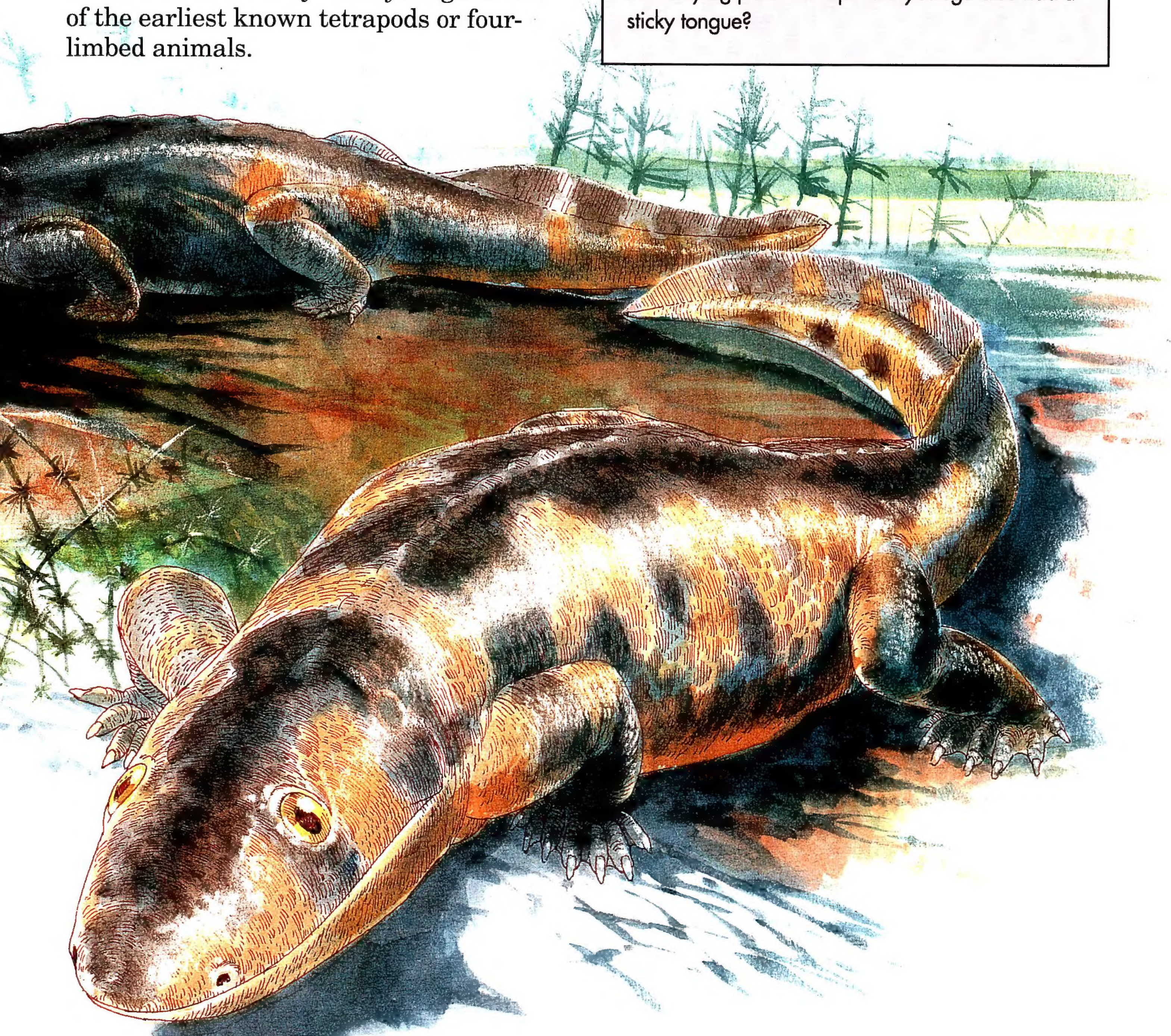
Ichthyostega had long, broad jaws lined with little spiky teeth. As it swam, it probably opened its mouth, scooped up its prey and snapped the jaw shut over the trapped victim.

SPRAWLING CRAWLER

The biggest clue to *Ichthyostega*'s lifestyle lies in the fact that it had four limbs where a fish has fins. These were fully formed like a land animal's legs and attached to the body by strong bones. This shows that *Ichthyostega*'s weight could be supported on dry land. Like a modern newt or salamander, it had sprawling limbs on either side of its body. *Ichthyostega* is one of the earliest known tetrapods or four-limbed animals.

Is it true that amphibians sometimes have special types of tongue?

Yes, amphibians were the very first creatures that had tongues which could shoot out to catch insects. Some of today's amphibians, such as salamanders, have tongues that are sticky. With a sticky tongue a salamander can easily catch an insect flying past. Perhaps *Ichthyostega* also had a sticky tongue?



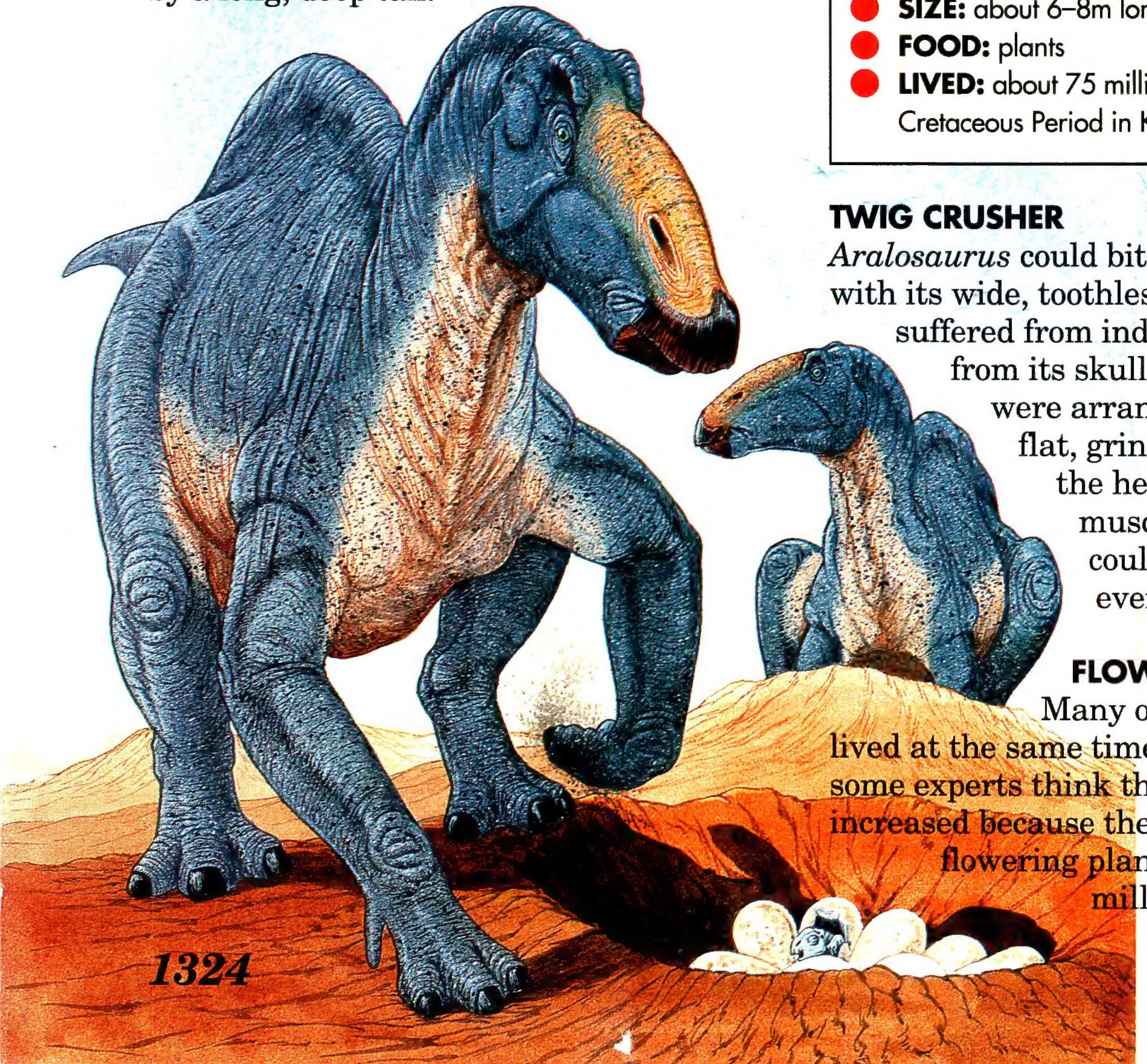
ARALOSAURUS

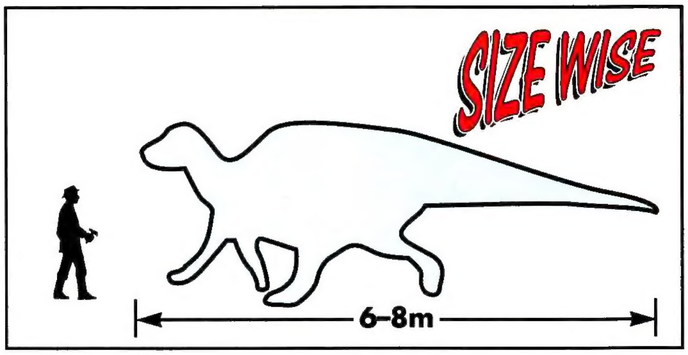
Aralosaurus had a ridge above its eyes like _Hadrosaurus_, and probably grew to be longer than today's elephant.

Experts think that *Aralosaurus* was related to *Maiasaura*. Like the 'good mother' dinosaur, *Aralosaurus* probably lived in large herds and laid its eggs in shared nesting sites.

DEEP END

Aralosaurus walked among the flowers and trees of the Cretaceous on two strong legs. Its head and front legs were balanced by a long, deep tail.





MONSTER FACTS

- **NAME:** Aralosaurus (a-ral-o-saw-rus) means 'Aral reptile' as it was found near the Aral Sea
- **GROUP:** dinosaur
- **SIZE:** about 6–8m long
- **FOOD:** plants
- **LIVED:** about 75 million years ago in the Late Cretaceous Period in Kazakhstan, central Asia

TWIG CRUSHER

Aralosaurus could bite into tough twigs with its wide, toothless beak. But it never suffered from indigestion! Evidence from its skull shows how its teeth were arranged in rows to form a flat, grinding surface. With the help of its strong jaw muscles, *Aralosaurus* could crush and slice even the toughest food.

FLOWER POWER

Many other hadrosaurids lived at the same time as *Aralosaurus* and some experts think that their numbers increased because they could eat the new flowering plants that flourished 75 million years ago.

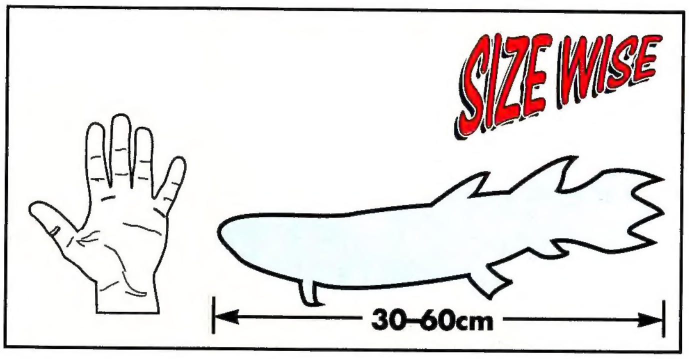
EUSTHENOPTERON

***Eusthenopteron* was a fish that could survive out of water because it had lungs as well as gills.**

The seasonal hot, dry weather of the Devonian Period held great dangers for water-living creatures. As lakes and pools dried up, fishes were left stranded, and died. The only survivors were animals such as *Eusthenopteron* that could breathe air until they found more water in which to live.

FOOT FINS

Eusthenopteron's back and skull were very like those of early amphibians. Inside its fins there were a number of small bones. These later evolved into the leg bones and feet of amphibians. Such strong fins helped *Eusthenopteron* drag itself along the ground when it needed to find a new source of water.

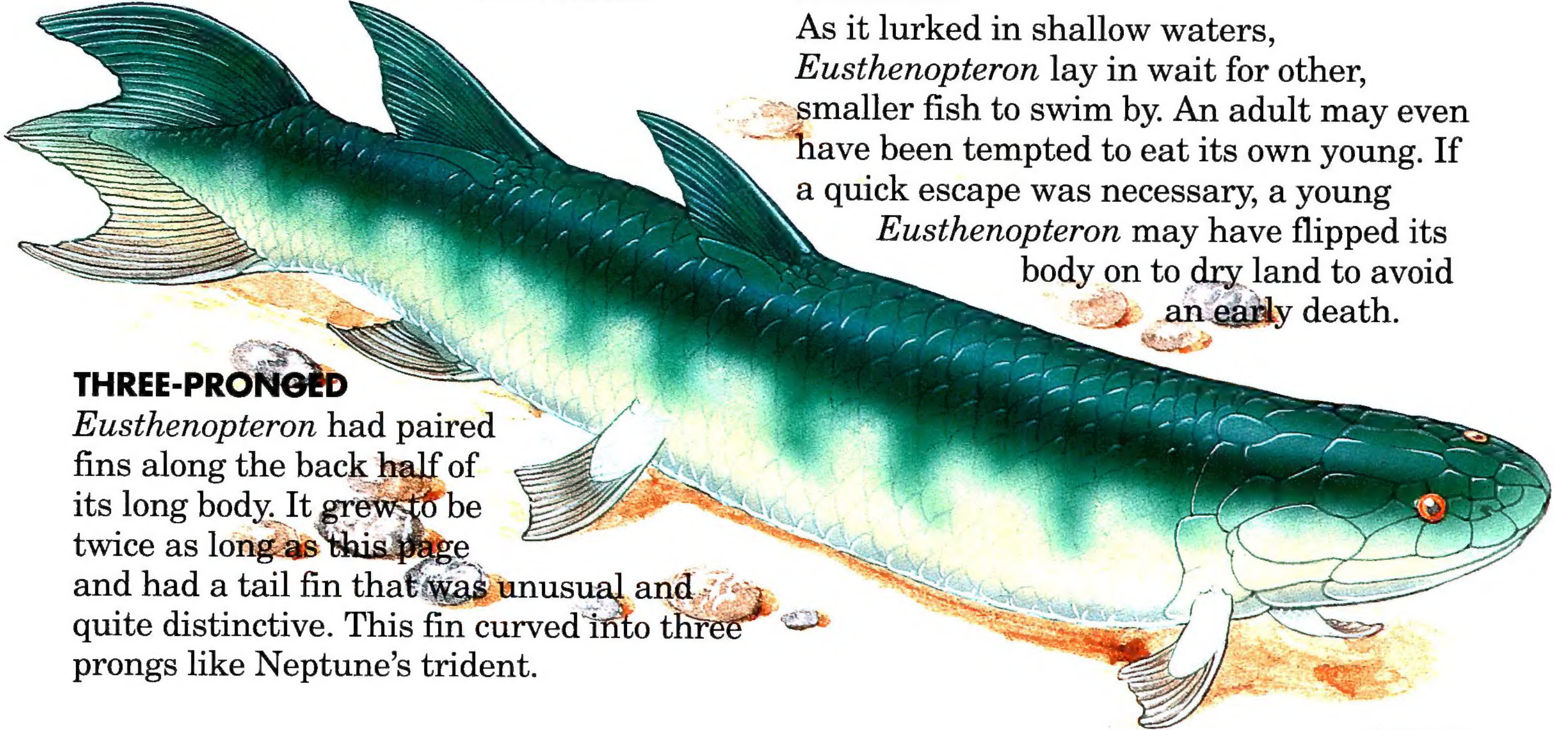


MONSTER FACTS

- **NAME:** *Eusthenopteron* (yoos-then-op-ter-un) means 'strong fin'
- **GROUP:** fish
- **SIZE:** about 30–60cm long
- **FOOD:** fish
- **LIVED:** about 350 million years ago in the Late Devonian Period in fresh and salt waters of Europe and North America

BACK FLIP

As it lurked in shallow waters, *Eusthenopteron* lay in wait for other, smaller fish to swim by. An adult may even have been tempted to eat its own young. If a quick escape was necessary, a young *Eusthenopteron* may have flipped its body on to dry land to avoid an early death.

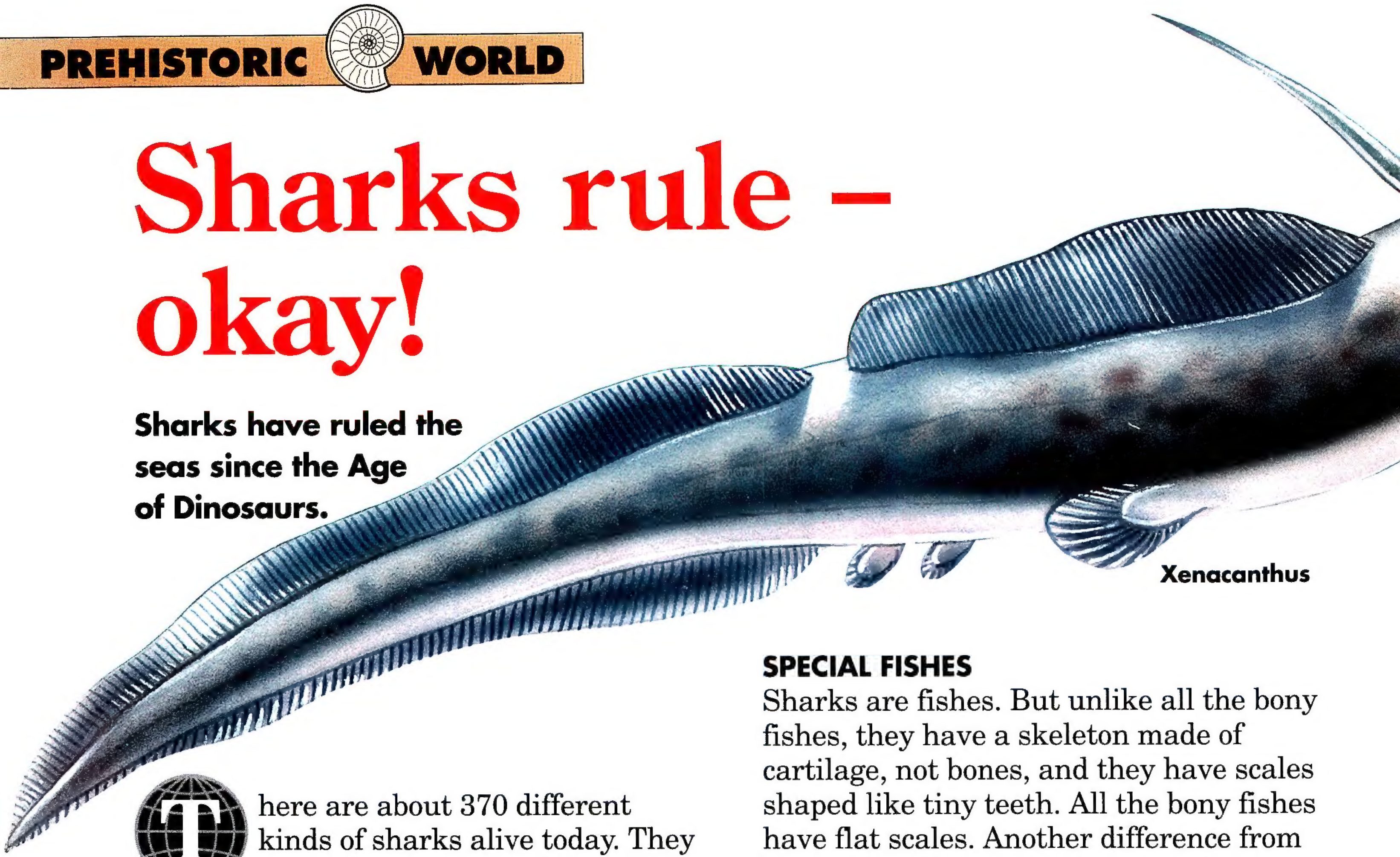


THREE-PRONGED

Eusthenopteron had paired fins along the back half of its long body. It grew to be twice as long as this page and had a tail fin that was unusual and quite distinctive. This fin curved into three prongs like Neptune's trident.

Sharks rule – okay!

Sharks have ruled the seas since the Age of Dinosaurs.



Xenacanthus

There are about 370 different kinds of sharks alive today. They range from the little dogfishes to the giant, peaceful, plankton-guzzling basking sharks and the fearsome, man-eating great white shark.

IT'S A FACT

SHARKS HAVE TO KEEP SWIMMING

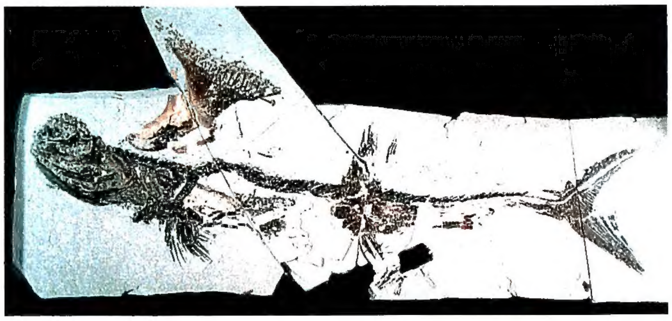
To keep afloat sharks have to keep swimming, otherwise they sink to the sea bed. Unlike other fishes, they do not have a swim bladder full of gas to keep them afloat, so they propel themselves along with the powerful thrust of their tails. If they stop beating their tails, they sink. Unlike other fishes, sharks cannot use their fins as brakes either. If a shark charges, it has to swerve aside to avoid a collision.

SPECIAL FISHES

Sharks are fishes. But unlike all the bony fishes, they have a skeleton made of cartilage, not bones, and they have scales shaped like tiny teeth. All the bony fishes have flat scales. Another difference from bony fishes is that sharks do not have swim bladders and have to keep moving all the time.

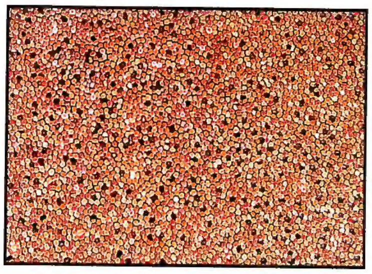
NO BONES ABOUT IT

Along with their close relatives, the skates and rays, sharks form a group called the cartilaginous fishes. Their skeletons are made of cartilage, not of bone. Cartilage is tough and gristly, but also flexible. It works well as a shark's skeleton but it decays more quickly, so it is less likely to form fossils.

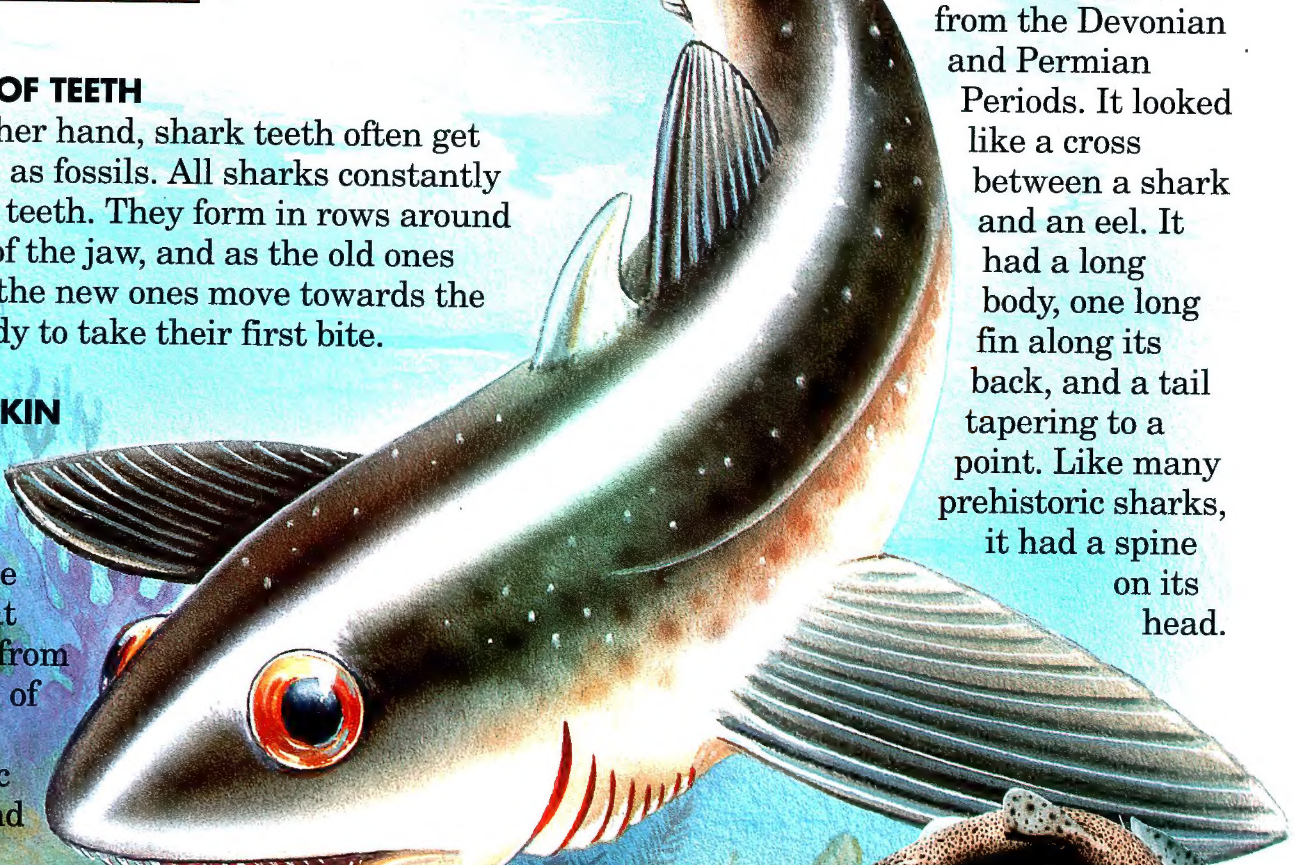


This *Stethacanthus* fossil clearly shows the shark's curious crest.

Sharks' teeth are very sharp.



Sharks' skin is covered in scales.



Cladoselache

TONNES OF TEETH

On the other hand, shark teeth often get preserved as fossils. All sharks constantly grow new teeth. They form in rows around the back of the jaw, and as the old ones drop out, the new ones move towards the front, ready to take their first bite.

ROUGH SKIN

Other bits that fossilized include the spines that stuck out from the bodies of some prehistoric sharks, and also the shark's tiny, tooth-shaped skin scales. These are called denticles, and they are different from the thin, flat scales of other fishes. Denticles make a shark's skin very tough, and rough to touch.

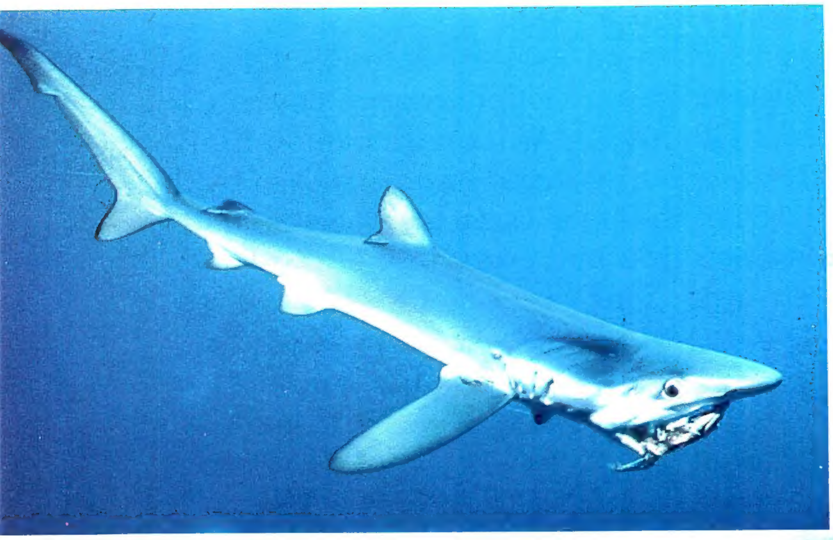
EARLY-BIRD SHARK

Some of the earliest shark fossils yet discovered were found by an American fossil hunter, Dr William Kepler, in the 1880s. He discovered impressions of teeth, the harder bits of cartilage, the skin and body outline, and even some of the muscles. This very early shark is called *Cladoselache*. It was up to 2m long and had the typical streamlined shark shape.

EEL-LIKE SHARK

Xenacanthus was another early shark from the Devonian and Permian Periods. It looked like a cross between a shark and an eel. It had a long body, one long fin along its back, and a tail tapering to a point. Like many prehistoric sharks, it had a spine on its head.

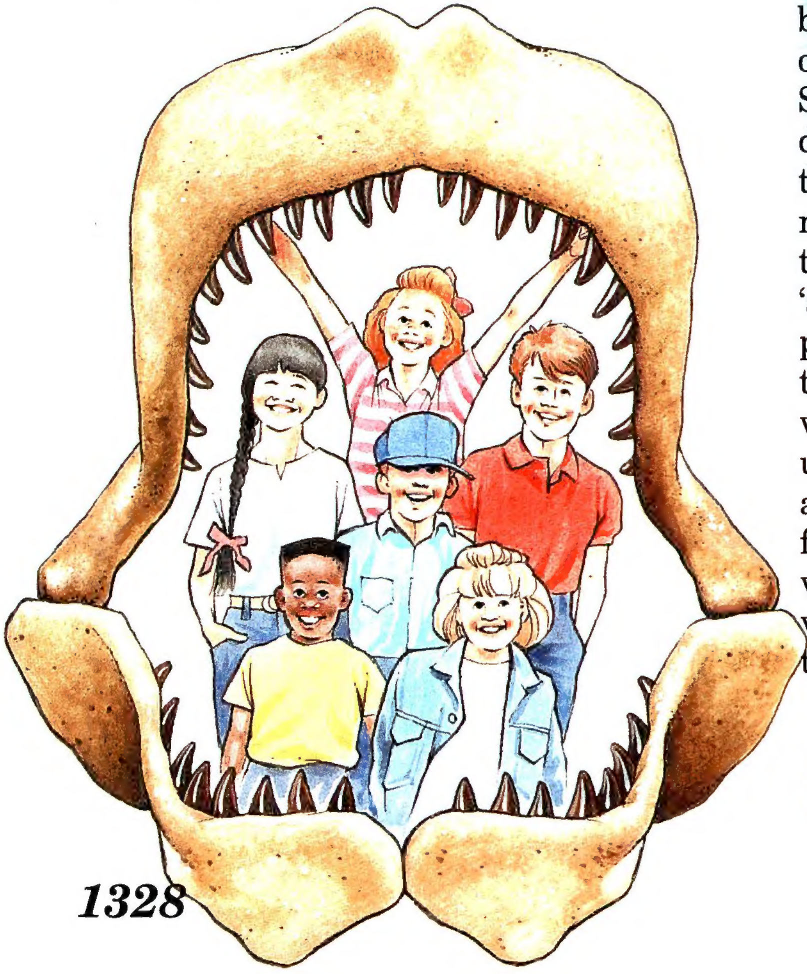
Today's dogfish is actually a small shark.



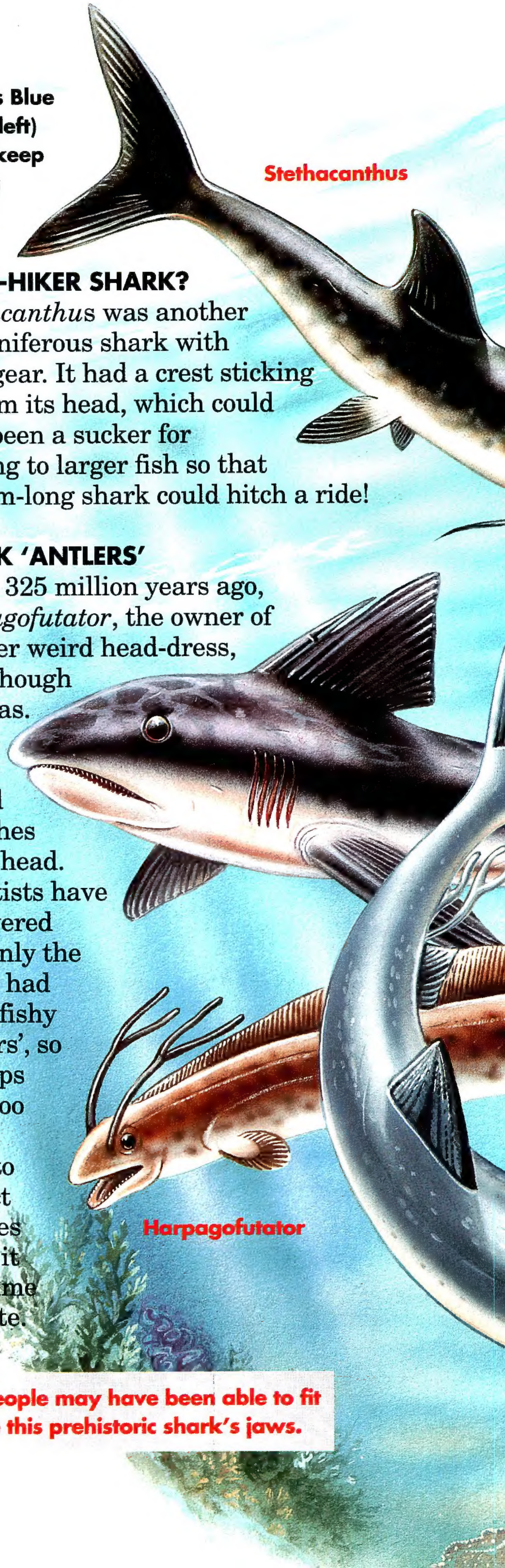
Today's Blue Shark (left) has to keep moving to stay alive.

SHARKS WITH SUNSHADES

There were some very strange sharks during the Carboniferous Period, around 350–280 million years ago. *Falcatus* was a tiny shark, only about 15cm long. It had a weird spine that stuck up from its neck and bent over its head, like a flat sunshade! Only adult males grew this odd spine, so it may have been for displaying to females when breeding.



Six people may have been able to fit inside this prehistoric shark's jaws.



HITCH-HIKER SHARK?

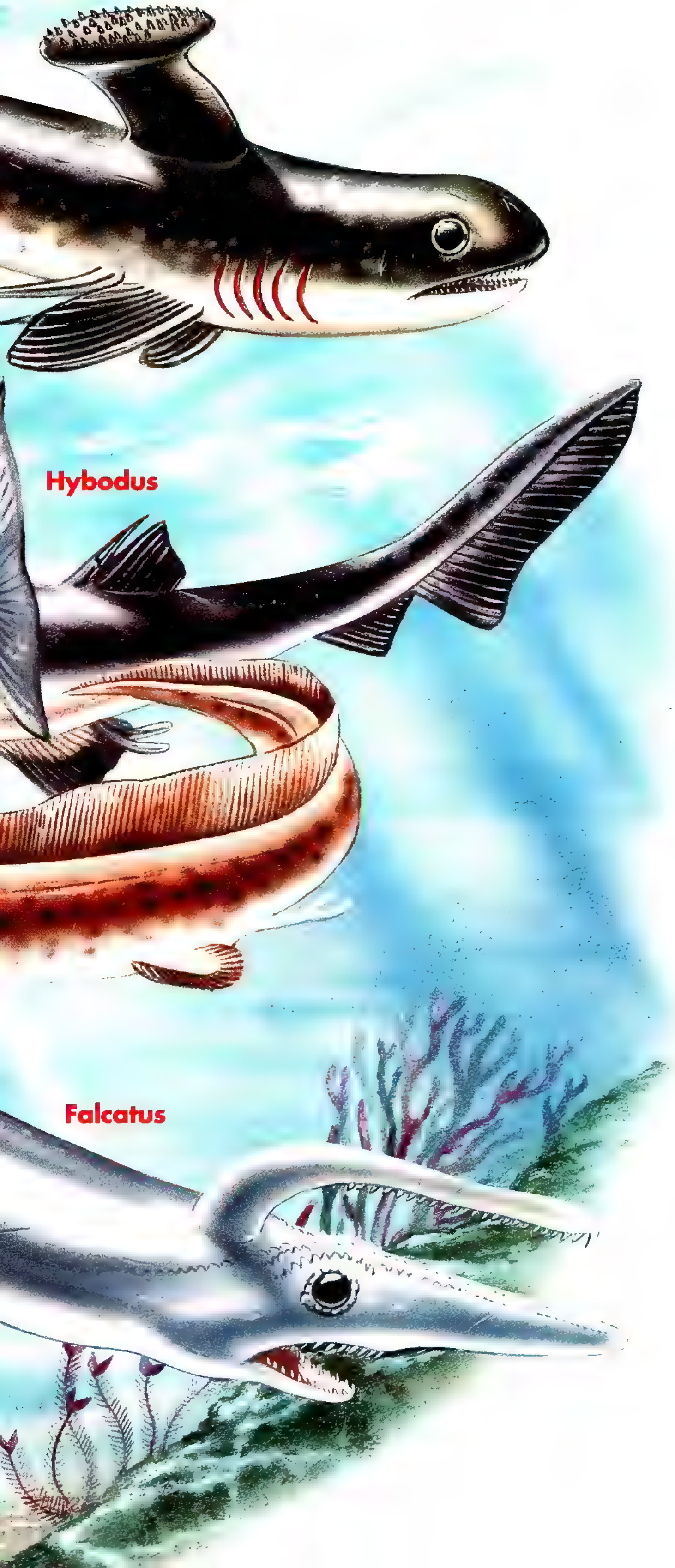
Stethacanthus was another Carboniferous shark with head-gear. It had a crest sticking up from its head, which could have been a sucker for sticking to larger fish so that this 1m-long shark could hitch a ride!

SHARK 'ANTLERS'

About 325 million years ago, *Harpagofutator*, the owner of another weird head-dress, sped though the seas. It had two forked branches on its head. Scientists have discovered that only the males had these fishy 'antlers', so perhaps they too were used to attract females when it was time to mate.

INTO THE CRETACEOUS

As dinosaurs spread on land during the Jurassic and Cretaceous Periods, sharks were still at large in the seas. *Hybodus* was over 2m long and looked incredibly similar to the Bull Shark of today.



MEGA SHARK

The biggest killer shark that ever lived was probably an extinct relative of today's Great White Shark. This prehistoric killer lived about 50 million years ago and was called *Carcharadon megalodon*, the mega-great-white. This giant is known only from its teeth. Each tooth was up to 15cm long, almost as big as an adult human hand.

Today's Great White Shark is related to the mega-shark, *Carcharadon megalodon*, which was the biggest shark ever to have lived.

A FAIRLY BIG GIANT

Years ago, experts compared the teeth of the modern Great White to its fossil mega-relative. They estimated that the mega-shark was up to 24m long, with a mouth 2.7m across that could open 1.8m and fit about six people inside! But this is probably too big. Modern estimates put the length of this extinct mega-great-white at 13m, compared to today's great white at about 9m, and the biggest of all sharks, the whale shark, at 17m.

Is it true that sharks came before dinosaurs?

Yes. Sharks appeared in the Devonian Period, more than 140 million years before the dinosaurs. They have lived in the seas of the world for about 400 million years and are one of the great success stories of life on Earth.

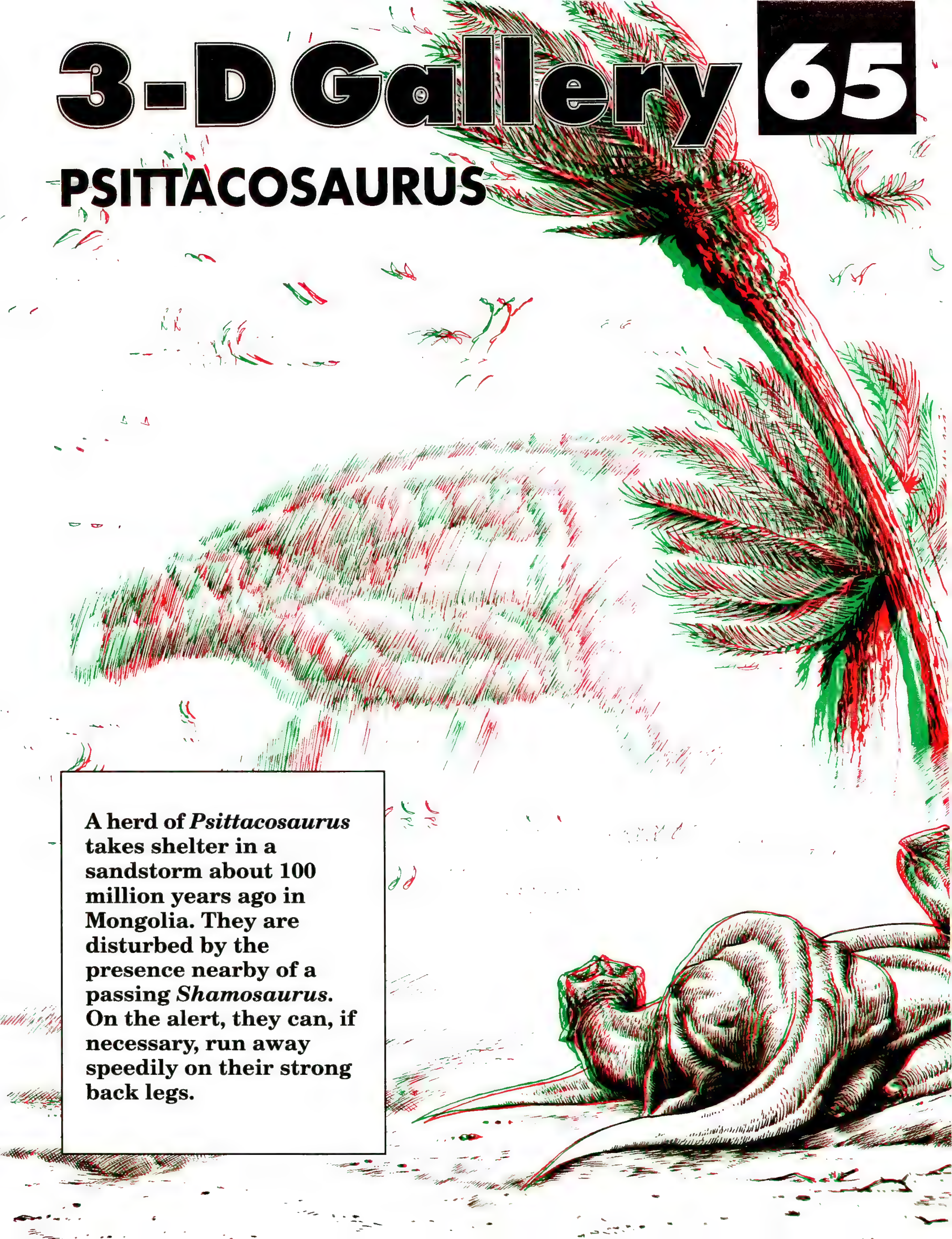
GIANTS OF THE PAST

In the swampy, damp atmosphere of the Devonian Period, 340 million years ago, these *Ichthyostega* are lying in wait for their dinner – unsuspecting fish. One has already caught a tasty morsel in his broad jaws and is about to devour it. These scaly amphibians were equally happy living on swampy land or in the water.

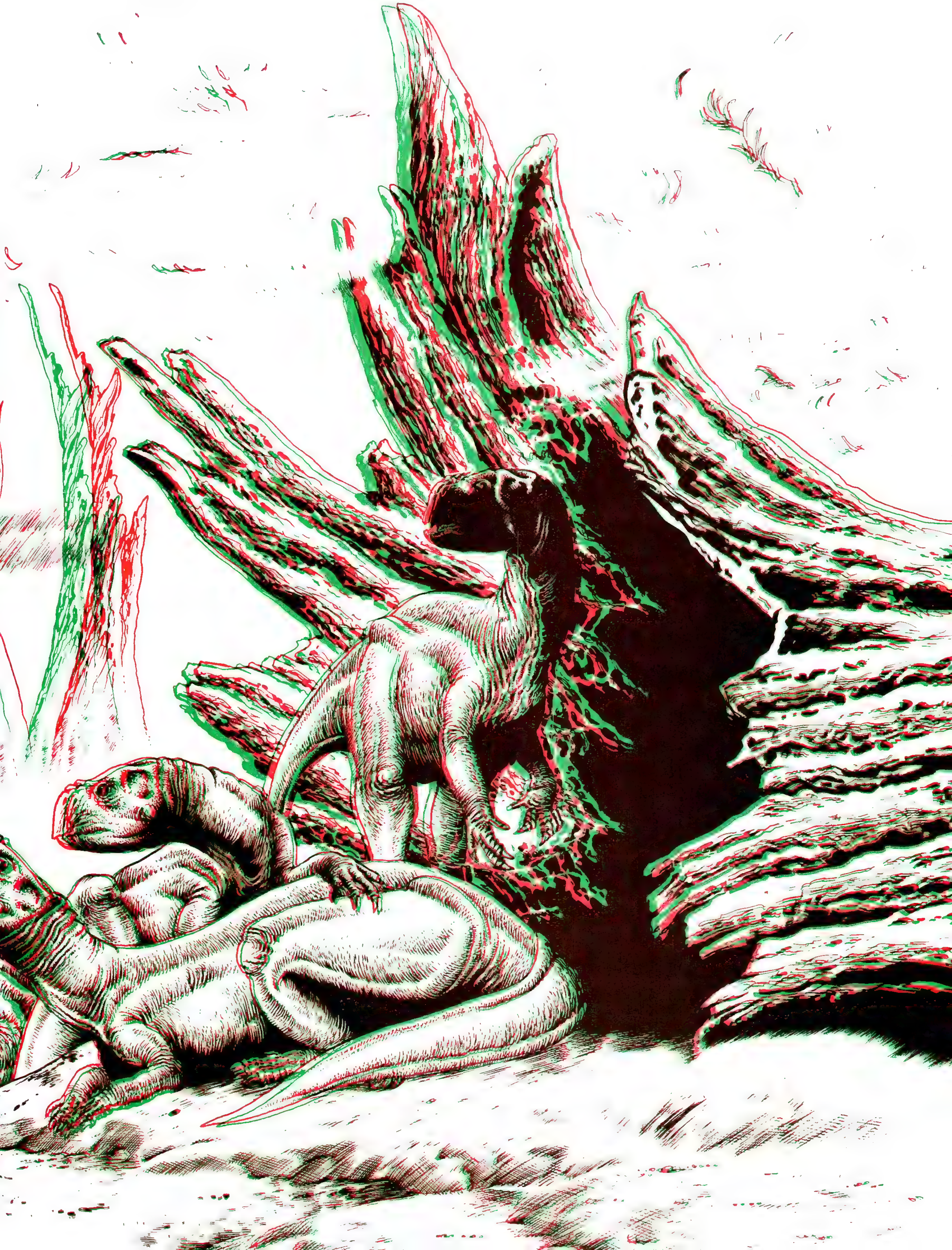
ICHTHYOSTEGA

3-D Gallery 65

PSITTACOSAURUS



A herd of *Psittacosaurus* takes shelter in a sandstorm about 100 million years ago in Mongolia. They are disturbed by the presence nearby of a passing *Shamosaurus*. On the alert, they can, if necessary, run away speedily on their strong back legs.



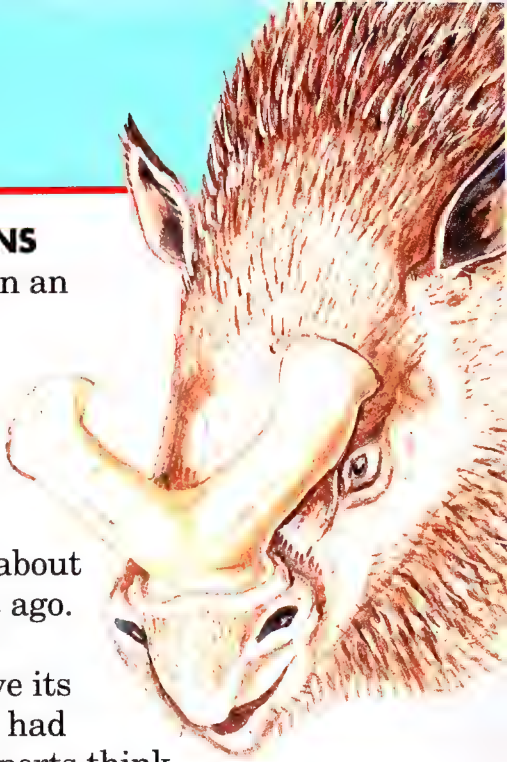
Horns

Horns, whether big or small, were an important form of defence for many of the prehistoric plant-eaters.

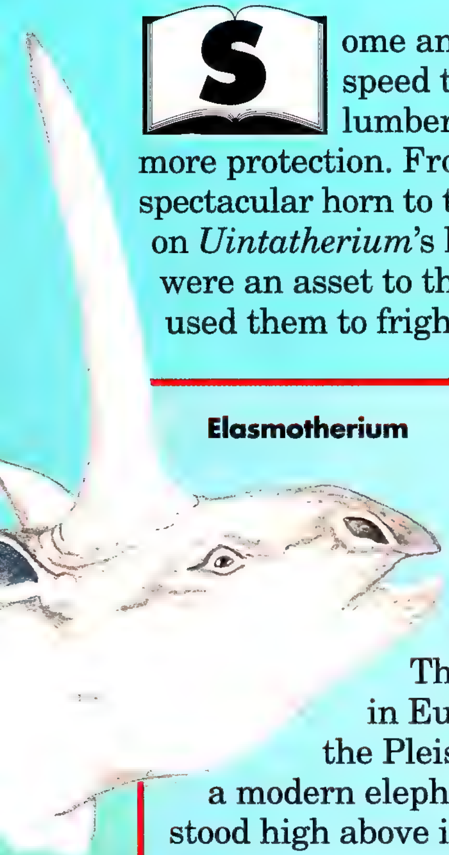
Some animals can rely on their speed to escape danger. Slow, lumbering creatures need more protection. From *Elasmotherium*'s spectacular horn to the six strange knobs on *Uintatherium*'s head, these weapons were an asset to their owners. They often used them to frighten away enemies.

CATAPULT HORNS

Halfway between an elephant and a rhinoceros in size, huge *Brontotherium* lived on the open plains of North America about 35 million years ago. Its catapult-like horns were above its snout. As males had larger horns, experts think that they fought with rivals.



Brontotherium



Elasmotherium

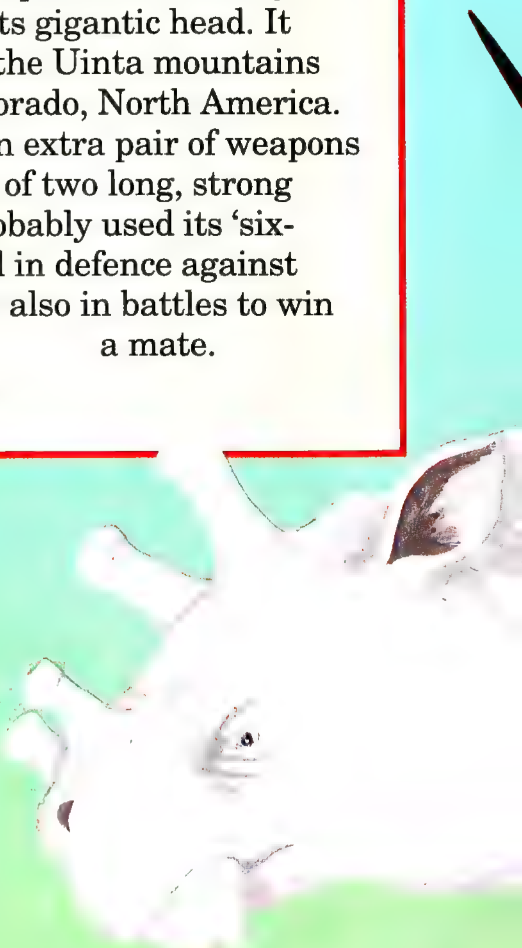
CHARGE!

Imagine *Elasmotherium* charging at you with its head bent. It would be terrifying! This early rhinoceros lived in Europe and Asia during the Pleistocene. It was as big as a modern elephant and its single horn stood high above its head.

MULTI-HORNED

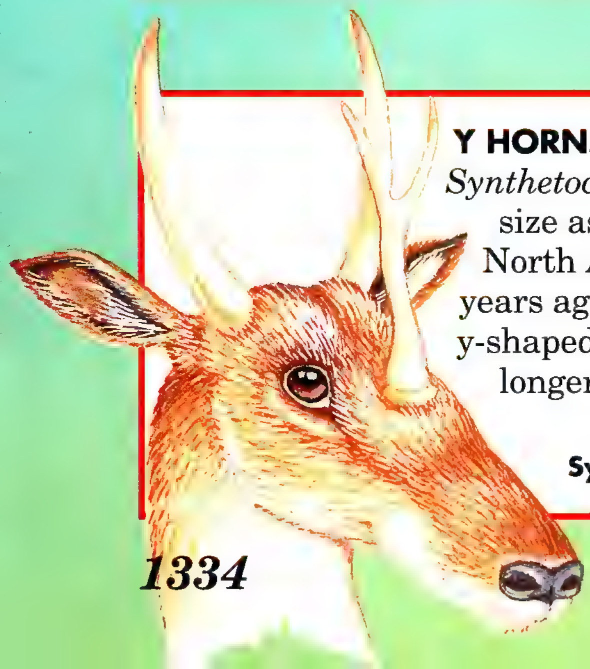
Uintatherium had three pairs of horns which sprouted like bony knobs from its gigantic head. It lived where the Uinta mountains stand in Colorado, North America. Males had an extra pair of weapons in the shape of two long, strong 'fangs'. It probably used its 'six-horned' head in defence against enemies and also in battles to win a mate.

Uintatherium



Y HORNS

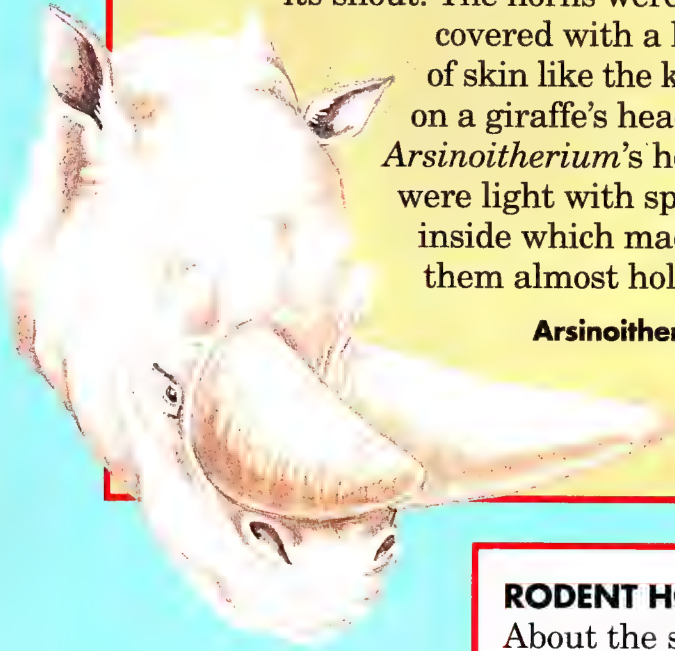
Synthetoceras was about the same size as a modern deer. It lived in North America about 10 million years ago. The males had bizarre y-shaped horns which grew to be longer than the animal's head.



Synthetoceras

SIDE BY SIDE

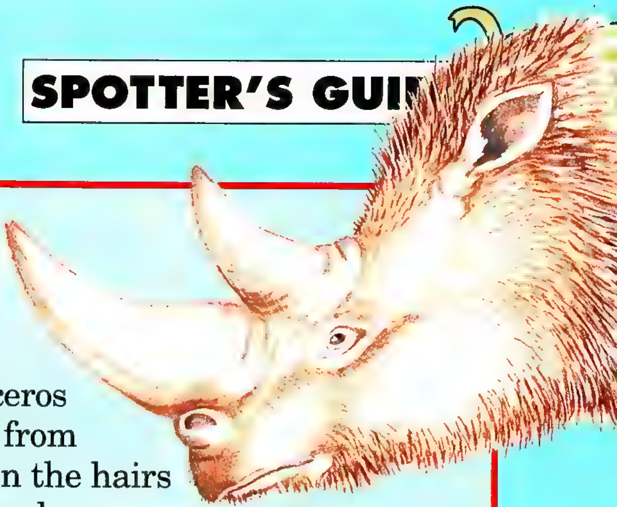
Arsinoitherium had two large, flat horns which stood side by side above its snout. The horns were covered with a layer of skin like the knobs on a giraffe's head. *Arsinoitherium*'s horns were light with spaces inside which made them almost hollow.



Arsinoitherium

HAIR HORNS

The horns of the rhinoceros are made from hair. When the hairs become stuck together they are amazingly strong. *Dicerorhinus* was a prehistoric rhinoceros which lived in Central Europe over a million years ago. It had two horns, one above the other, with the longer horn nearest to its snout.

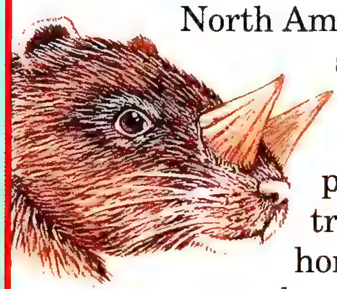


Dicerorhinus

The horns of today's rhinos resemble their ancestors'.

RODENT HORNS

About the size of a small rabbit, *Epigaulus* belonged to the rodent family, which includes mice, rats and beavers. It lived in the mid-west of Miocene North America. This strange little mammal had a short pair of triangular horns right above its nose.

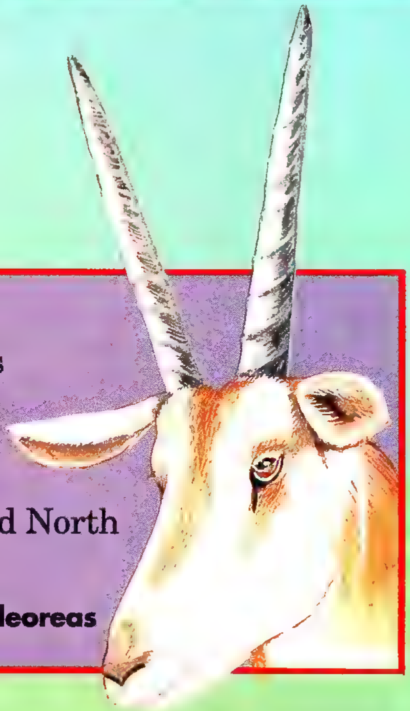


Epigaulus

SPIRAL TOP

Little *Paleoreas* had two spiral horns which stood straight up from the top of its head like the Arabian Oryx of today. Both males and females had horns. *Paleoreas* lived in Europe, Asia and North Africa over seven million years ago.

Arabian Oryx



Paleoreas

Out of the water

Hundreds of millions of years ago a wonderful thing happened – fishes began to walk!

The first fishes crawled out of the water about 370 million years ago. By doing this they changed the whole course of evolution. All land-living creatures with backbones are descended from these early adventurers. But how and why did this amazing advance occur? Scientists have pieced together the puzzle from the following vital clues.

The skull and forelimb of *Eusthenopteron*, a lobe-fin fish.

With simple lungs, this early lobe-fin slides on to the land where it can feast on insects and mites.

PLANT POWER

Experts believe it was the water plants that led the way. There was no life on land for many millions of years. Then around 430 million years ago the first plants took root on shore. One of the earliest was a marsh plant called *Cooksonia*.

Is it true that the first fish crawled out of the water on to land to find more water?

It sounds weird but it is one theory. The idea is that when their ponds dried up, the lobe-fins needed to find more water in a hurry. Experts think that could be one of the reasons why they used their fins like legs – to stagger to new ponds in times of drought.

INSECTS APPEAR

Once the first plants had established themselves, insects, mites and spiders followed. Soon worms burrowed in the mud and moist vegetation. A whole new world grew up full of good things to eat.

A FEAST ON LAND

Some fish had simple lungs and so could hunt for insects around the edge of the water. Keen to take advantage of the food on shore, they evolved to feast on land.

LUNG POWER

Fishes that could breathe in the air as well as underwater appeared about 390 million years ago. They were called lobe-fins and were probably the first fishes to venture on to land. *Eusthenopteron* was a lobe-fin. It had lungs like us for breathing air, and gills like a fish for breathing in water.

LEARNING TO WALK

Lobe-fins had bony fins under their bodies, which they used like legs to push their bodies out of the shallows and wriggle their way across the ground.

Today's mudskippers behave like the early lobe-fins, wriggling across the mud.

This rare Australian Lungfish has a single lung as well as gills. It looks very like the lobe-fins did around 390 million years ago.

MOVING ON

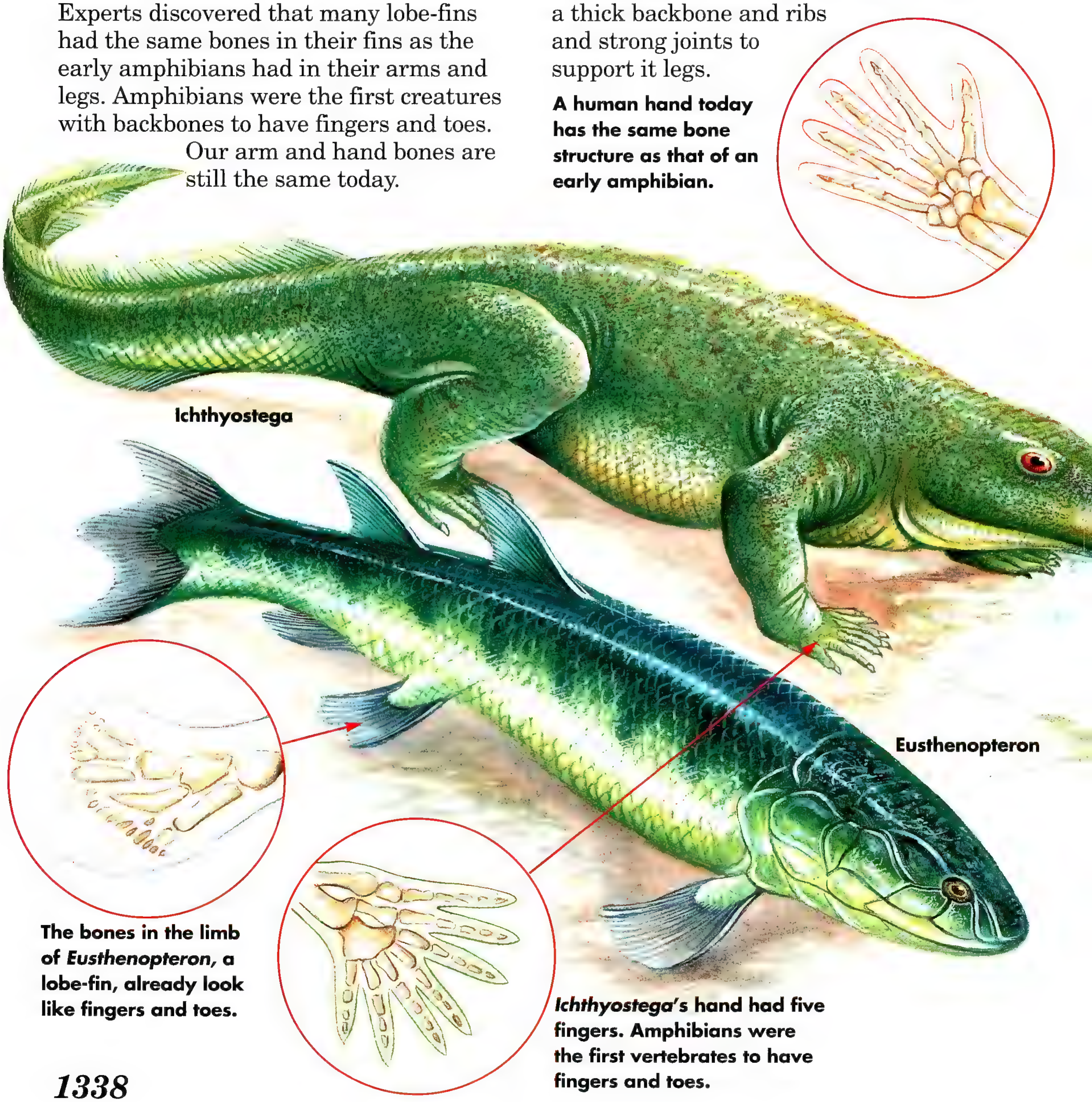
How did a clumsy lobe-fin survive on land? Over millions of years, its body shape changed. Its fins turned into sturdy legs and it evolved into the first amphibian.

FISH FINGERS

Experts discovered that many lobe-fins had the same bones in their fins as the early amphibians had in their arms and legs. Amphibians were the first creatures with backbones to have fingers and toes. Our arm and hand bones are still the same today.

STRONGER BACKS

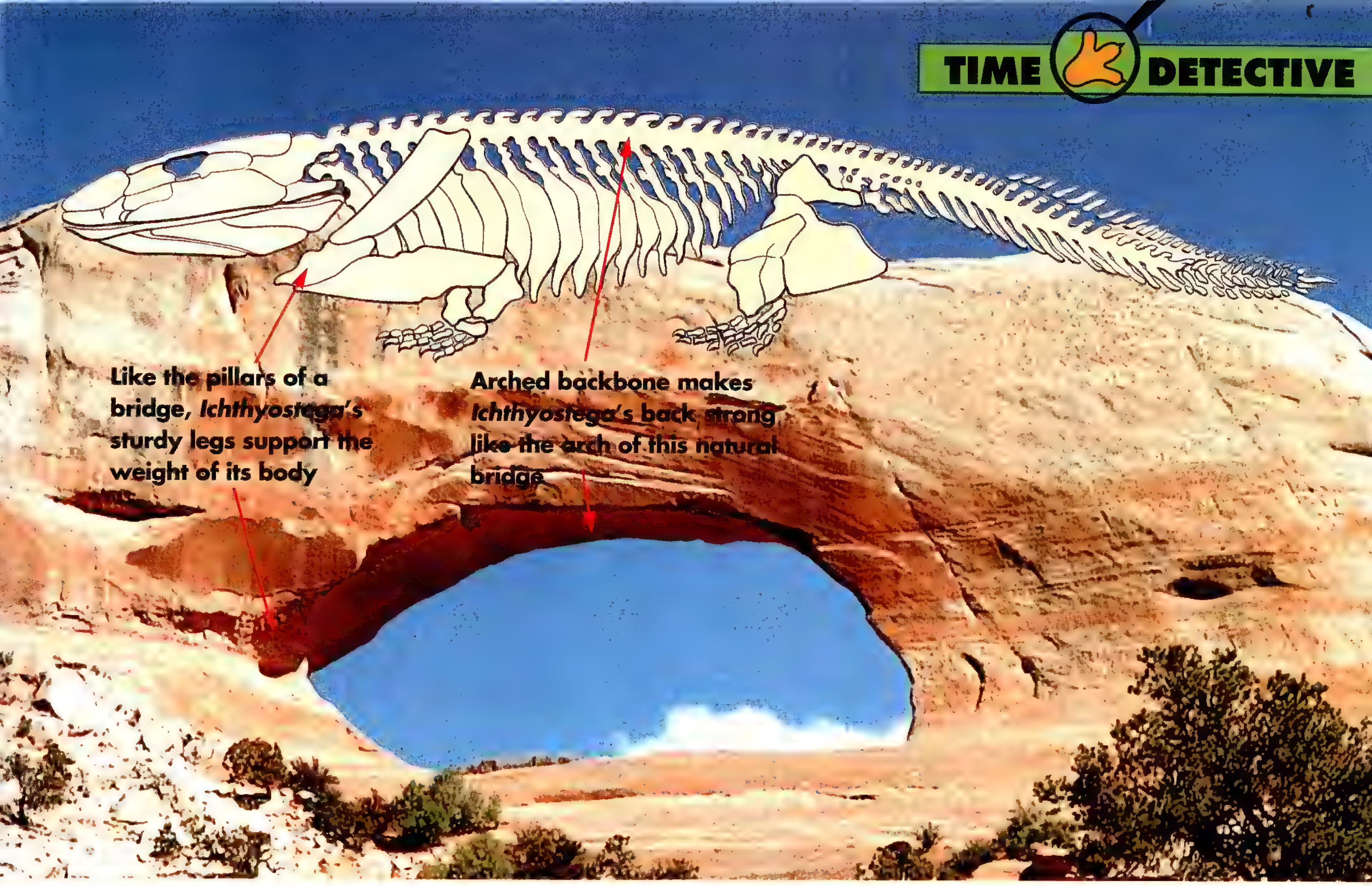
Early amphibians still looked like fish. To walk they had to raise their bodies off the ground. So they developed a strong backbone with an arch to hold the body up. One of the first amphibians was *Ichthyostega*. It was powerfully built with a thick backbone and ribs and strong joints to support it legs.



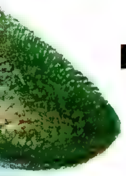
A human hand today has the same bone structure as that of an early amphibian.

The bones in the limb of *Eusthenopteron*, a lobe-fin, already look like fingers and toes.

***Ichthyostega*'s hand had five fingers. Amphibians were the first vertebrates to have fingers and toes.**


Like the pillars of a bridge, *Ichthyostega's* sturdy legs support the weight of its body
Arched backbone makes *Ichthyostega's* back strong like the arch of this natural bridge

The shape of *Ichthyostega's* backbone was similar to that of this natural bridge. This curved shape is very strong and allowed this amphibian to raise its body up and walk on land.



DEEP BREATHS

Lobe-fins had simple lungs. They could breathe when out of water just long enough to snap up insects living on the river banks. But they could not survive in the air for long.

POWERFUL LUNGS

They had to evolve powerful lungs to become amphibians. Experts think *Ichthyostega* probably breathed by lowering the floor of its mouth to draw air in, and raising it to pump air down into its lungs.

FISH FANGS

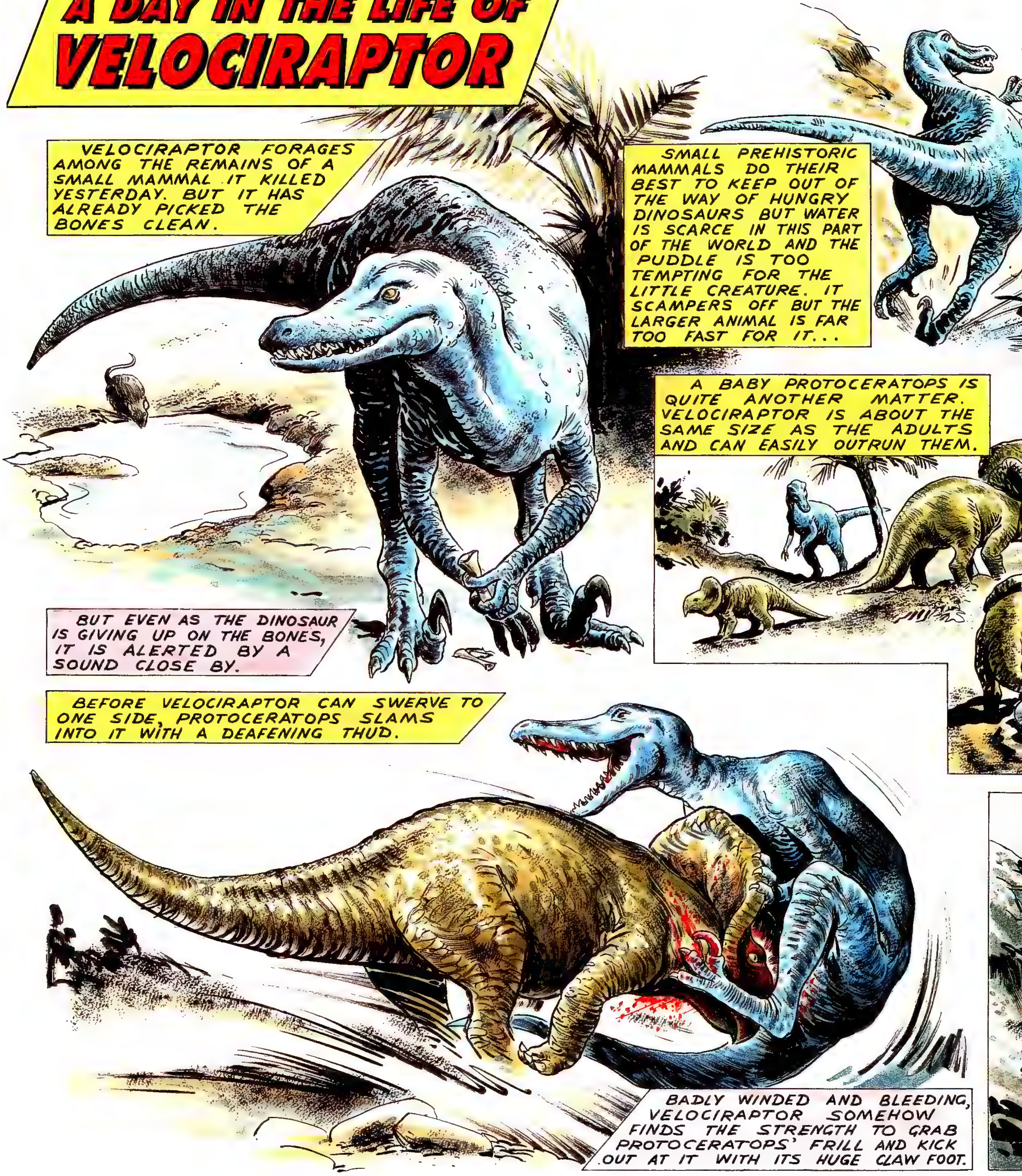
Experts have found another vital clue to prove that the first amphibian evolved from a fish. They have discovered that early amphibian teeth were almost identical to some lobe-fin teeth.

IT'S A FACT

AMPHIBIANS CAN HEAR LIKE US

Sound travels in a different way on land than it does in water. Fish 'hear' by sensing the vibrations made by sound moving through the water. But amphibians have developed both pockets of air and pools of water inside their heads. Amphibians hear when sound travels into their ears and vibrates through these pockets of air and pools of water. We hear in the same way.

A DAY IN THE LIFE OF VELOCIRAPTOR



VELOCIRAPTOR FORAGES AMONG THE REMAINS OF A SMALL MAMMAL IT KILLED YESTERDAY. BUT IT HAS ALREADY PICKED THE BONES CLEAN.

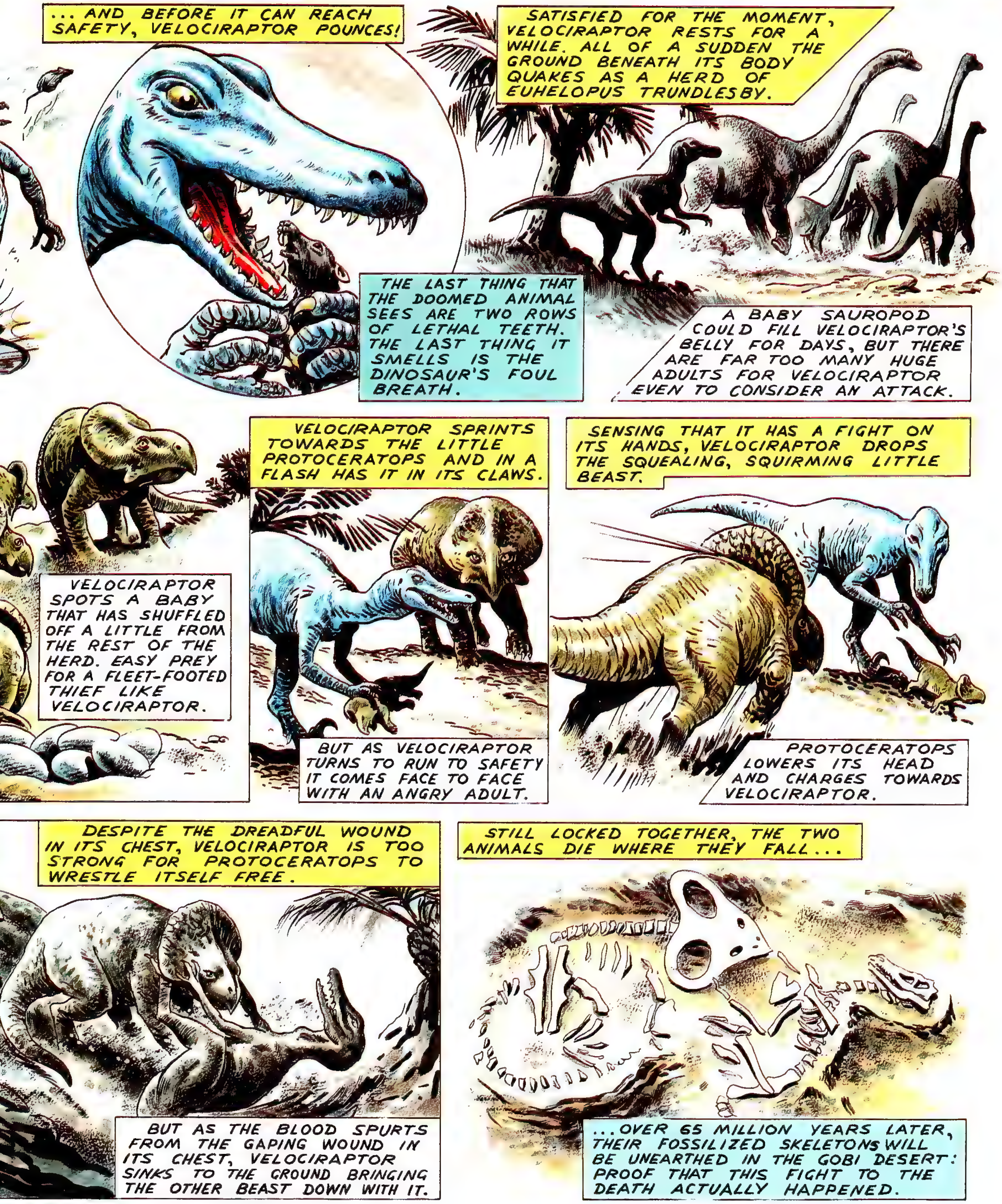
SMALL PREHISTORIC MAMMALS DO THEIR BEST TO KEEP OUT OF THE WAY OF HUNGRY DINOSAURS BUT WATER IS SCARCE IN THIS PART OF THE WORLD AND THE PUDDLE IS TOO TEMPTING FOR THE LITTLE CREATURE. IT SCAMPERS OFF BUT THE LARGER ANIMAL IS FAR TOO FAST FOR IT...

A BABY PROTOCERATOPS IS QUITE ANOTHER MATTER. VELOCIRAPTOR IS ABOUT THE SAME SIZE AS THE ADULTS AND CAN EASILY OUTRUN THEM.

BUT EVEN AS THE DINOSAUR IS GIVING UP ON THE BONES, IT IS ALERTED BY A SOUND CLOSE BY.

BEFORE VELOCIRAPTOR CAN SWERVE TO ONE SIDE, PROTOCERATOPS SLAMS INTO IT WITH A DEAFENING THUD.

BADLY WINDED AND BLEEDING, VELOCIRAPTOR SOMEHOW FINDS THE STRENGTH TO GRAB PROTOCERATOPS' FRILL AND KICK OUT AT IT WITH ITS HUGE CLAW FOOT.


... AND BEFORE IT CAN REACH SAFETY, VELOCIRAPTOR POUNCES!
THE LAST THING THAT THE DOOMED ANIMAL SEES ARE TWO ROWS OF LETHAL TEETH. THE LAST THING IT SMELLS IS THE DINOSAUR'S FOUL BREATH.
SATISFIED FOR THE MOMENT, VELOCIRAPTOR RESTS FOR A WHILE. ALL OF A SUDDEN THE GROUND BENEATH ITS BODY QUAKES AS A HERD OF EUHELOPUS TRUNDLES BY.
A BABY SAUROPOD COULD FILL VELOCIRAPTOR'S BELLY FOR DAYS, BUT THERE ARE FAR TOO MANY HUGE ADULTS FOR VELOCIRAPTOR EVEN TO CONSIDER AN ATTACK.
VELOCIRAPTOR SPOTS A BABY THAT HAS SHUFFLED OFF A LITTLE FROM THE REST OF THE HERD. EASY PREY FOR A FLEET-FOOTED THIEF LIKE VELOCIRAPTOR.
VELOCIRAPTOR SPRINTS TOWARDS THE LITTLE PROTOCERATOPS AND IN A FLASH HAS IT IN ITS CLAWS.
BUT AS VELOCIRAPTOR TURNS TO RUN TO SAFETY IT COMES FACE TO FACE WITH AN ANGRY ADULT.
SENSING THAT IT HAS A FIGHT ON ITS HANDS, VELOCIRAPTOR DROPS THE SQUEALING, SQUIRMING LITTLE BEAST.
PROTOCERATOPS LOWERS ITS HEAD AND CHARGES TOWARDS VELOCIRAPTOR.
DESPITE THE DREADFUL WOUND IN ITS CHEST, VELOCIRAPTOR IS TOO STRONG FOR PROTOCERATOPS TO WRESTLE ITSELF FREE.
BUT AS THE BLOOD SPURTS FROM THE GAPING WOUND IN ITS CHEST, VELOCIRAPTOR SINKS TO THE GROUND BRINGING THE OTHER BEAST DOWN WITH IT.
STILL LOCKED TOGETHER, THE TWO ANIMALS DIE WHERE THEY FALL...
...OVER 65 MILLION YEARS LATER, THEIR FOSSILIZED SKELETONS WILL BE UNEARTHED IN THE GOBI DESERT: PROOF THAT THIS FIGHT TO THE DEATH ACTUALLY HAPPENED.

Improve and test your knowledge with...

FACT FILE

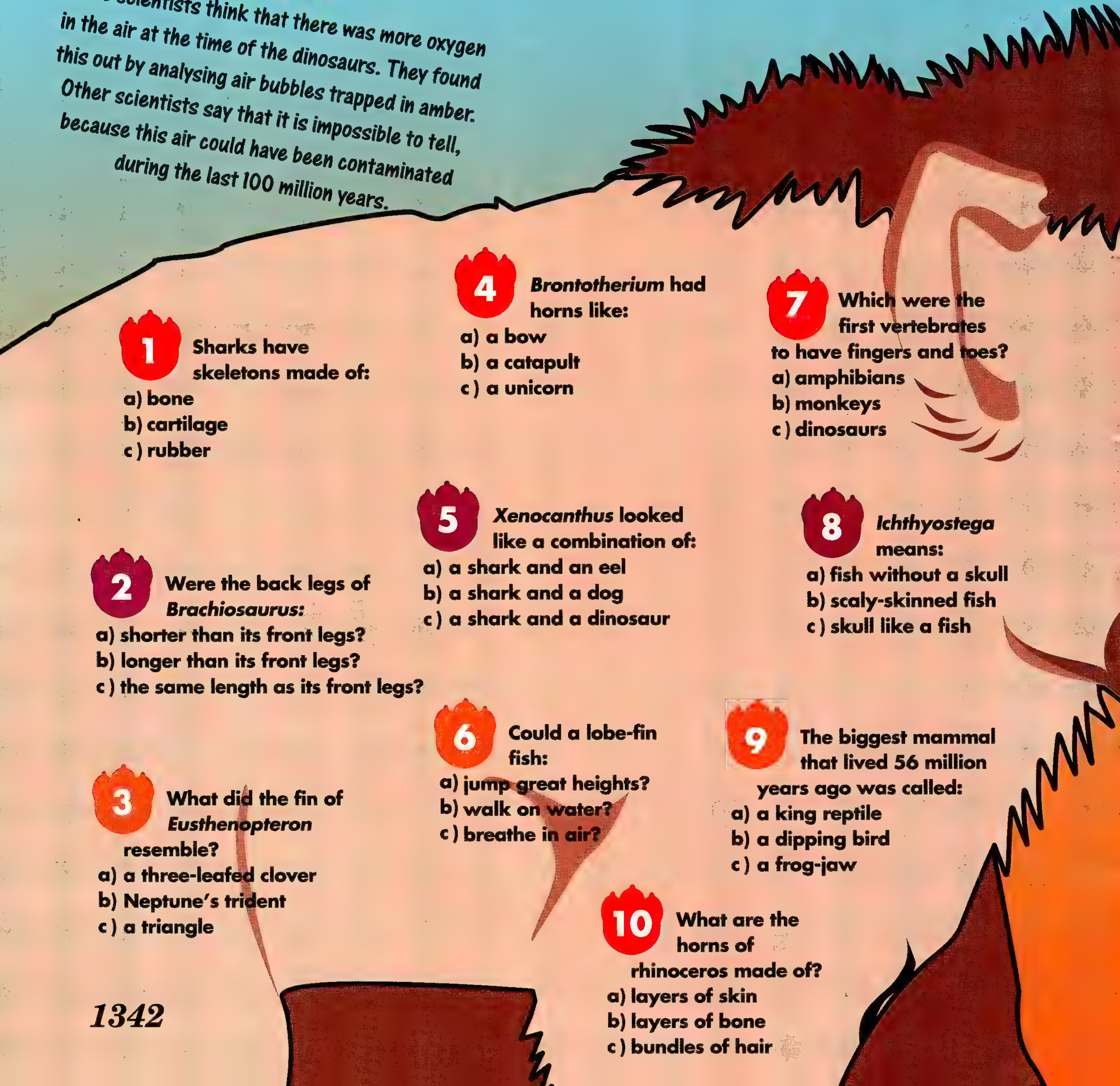
Follow the footprints to complete the quiz and get to the bottom of the question!

Keep out!

The ankylosaur *Euoplocephalus* had a head that was so heavily shielded that even the eyelids were armoured shutters.

Richer air

Some scientists think that there was more oxygen in the air at the time of the dinosaurs. They found this out by analysing air bubbles trapped in amber. Other scientists say that it is impossible to tell, because this air could have been contaminated during the last 100 million years.



1 Sharks have skeletons made of:
a) bone
b) cartilage
c) rubber

2 Were the back legs of *Brachiosaurus:*
a) shorter than its front legs?
b) longer than its front legs?
c) the same length as its front legs?

3 What did the fin of *Eusthenopteron* resemble?
a) a three-leafed clover
b) Neptune's trident
c) a triangle

4 *Brontotherium* had horns like:
a) a bow
b) a catapult
c) a unicorn

5 *Xenocanthus* looked like a combination of:
a) a shark and an eel
b) a shark and a dog
c) a shark and a dinosaur

6 Could a lobe-fin fish:
a) jump great heights?
b) walk on water?
c) breathe in air?

7 Which were the first vertebrates to have fingers and toes?
a) amphibians
b) monkeys
c) dinosaurs

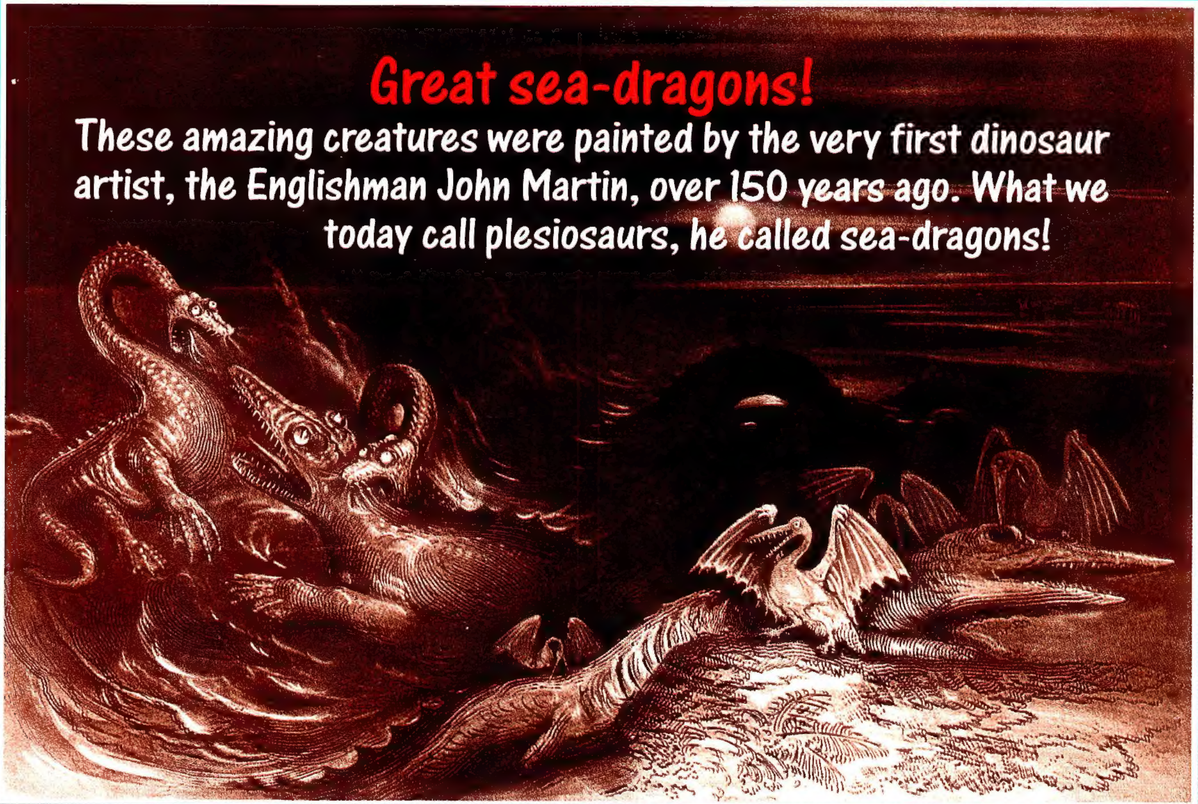
8 *Ichthyostega* means:
a) fish without a skull
b) scaly-skinned fish
c) skull like a fish

9 The biggest mammal that lived 56 million years ago was called:
a) a king reptile
b) a dipping bird
c) a frog-jaw

10 What are the horns of rhinoceros made of?
a) layers of skin
b) layers of bone
c) bundles of hair

Great sea-dragons!

These amazing creatures were painted by the very first dinosaur artist, the Englishman John Martin, over 150 years ago. What we today call plesiosaurs, he called sea-dragons!



Underwater flying

The first scientists to study pterosaurs could not believe that they were flying reptiles. They thought that the wings were used for swimming, like those of penguins.

Tyrant title

T rex was not always called by that name. When Henry Fairfield Osborn first discovered the dinosaur in 1902, he named it *Dynamosaurus imperiosus* (meaning 'imperial powerful lizard'). Osborn later changed his mind and called the mighty dinosaur *Tyrannosaurus rex* (king of the tyrant reptiles).

Answers to the questions on inside back cover

A to Z OF PREHISTORIC ANIMALS BA – BO

B

BAPTORNIS 70 MYA

Baptornis (bap-tore-nis) lived in the Late Cretaceous Period in the lakes and seas of North America. Although it had wings, these were not well-developed and it could not fly. *Baptornis* looked like the grebe of today with its long neck and pointed bill. A fish-eater, *Baptornis* escaped danger by diving and swimming under the surface of the water. Its name means 'dipping bird'.

BASILOSAURUS 54 MYA

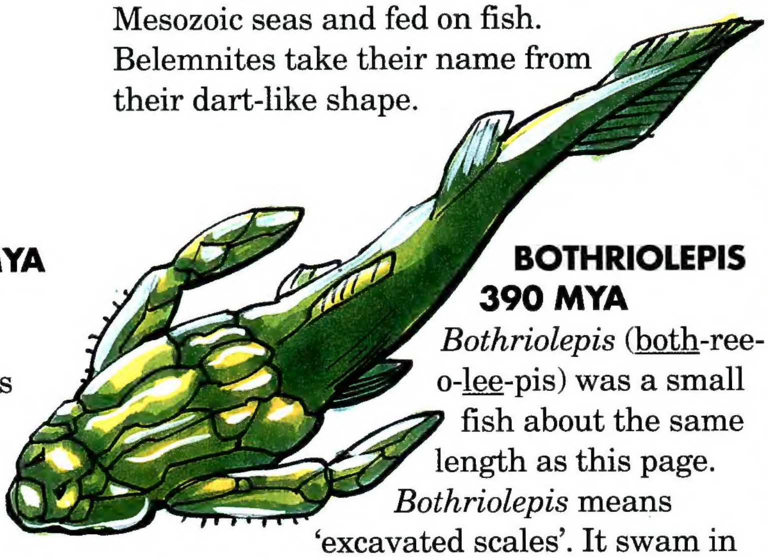
Basilosaurus (ba-zil-oh-saw-rus) moved through the seas of Africa and North America by making s-shaped movements with its long, slender body. About 54 million years ago, it was the biggest of the mammals. *Basilosaurus* grew up to 23m long and preyed on fish and other sea creatures. It had two tiny hind legs which were too small to be useful but showed the animal's link with land-living ancestors. *Basilosaurus* means 'king reptile' – when it was named it was thought to be a reptile not a mammal.

BATRACHOGNATHUS 140 MYA

Batrachognathus (ba-tra-cog-nay-thus) was a small pterosaur about the size of a modern crow. It used its hands and feet to keep its balance as it perched on branches, and held its wings up behind its body. Its name means 'frog-jaws'.

BELEMNITE 150 MYA

The bullet-shaped shells of fossilized belemnites (bell-lem-nites) puzzled many people when they were first found. These predatory, squid-like creatures swam in the Mesozoic seas and fed on fish. Belemnites take their name from their dart-like shape.



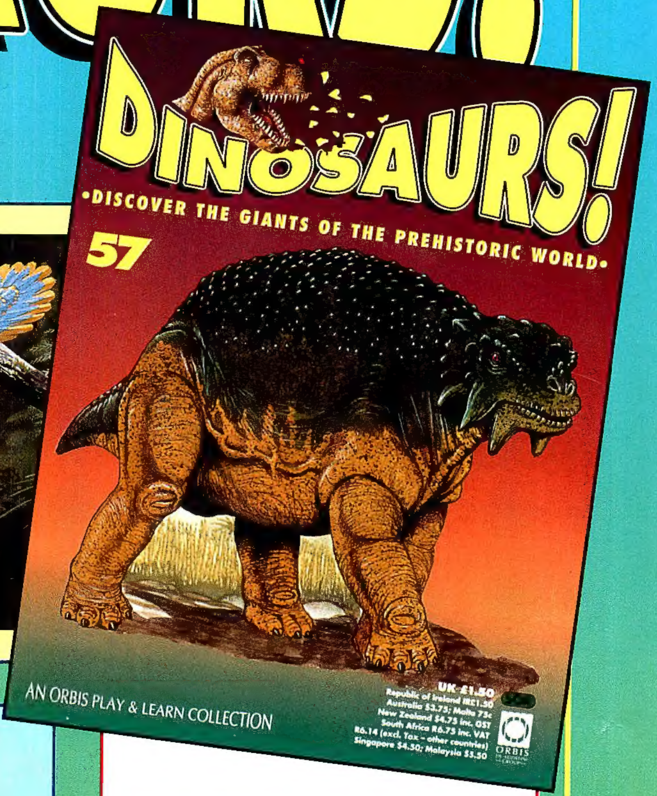
BOTHRIOLEPIS 390 MYA

Bothriolepis (both-ree-o-lee-pis) was a small fish about the same length as this page. *Bothriolepis* means 'excavated scales'. It swam in seas all over the world during the Devonian Period. *Bothriolepis* was a placoderm, one of the first fishes to have jaws and paired fins. Its eyes were on the top of its head.

MYA = MILLION YEARS AGO

COMING IN PART 57 OF

DINOSAURS!



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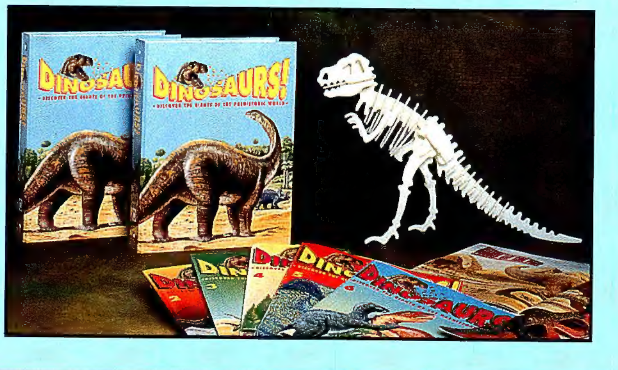

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PLUS

Catch up on your monster facts in IDENTIKIT and GIANTS OF THE PAST HISTORY IN PICTURES 3-D GALLERY

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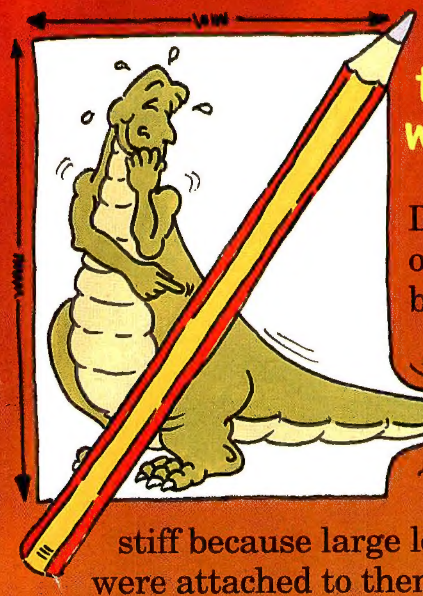
ANSWERS TO FACT FILE QUESTIONS: 1.b 2.a 3.b 4.b 5.a 6.c 7.a 8.c 9.a 10.c

Dr. David Norman of Cambridge University answers your dinosaur questions

ASK THE EXPERT



Were dinosaurs' tails straight or wiggly?

Dinosaurs' tails are often drawn wiggly because the artist has trouble fitting the whole tail in! But really their tails were held stiff because large leg-moving muscles were attached to them, and also because the tails often counter-balanced the front half of the body, and so needed to be stretched out.

Why are dinosaur skeletons black, when bone is white?

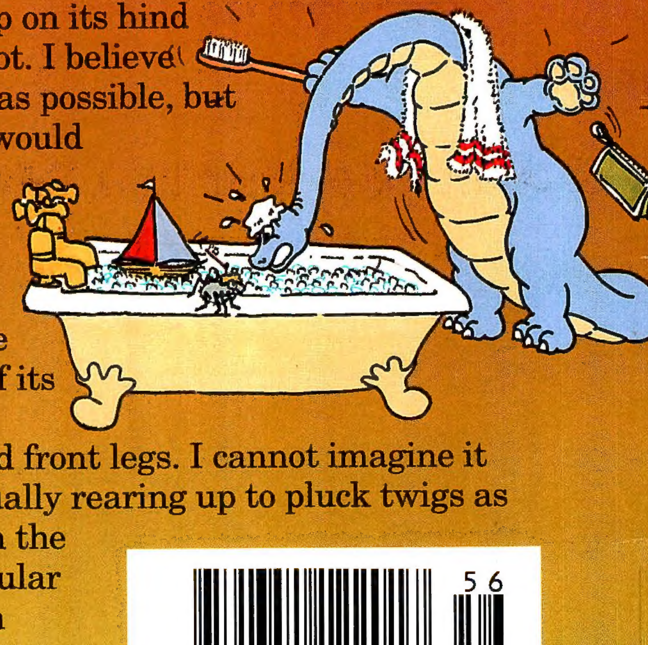
Not all dinosaur skeletons are black. Some may be casts that are painted black to make them look more dramatic in a museum gallery. Some skeletons may appear white, pink or grey, as well as black. It ultimately depends on the minerals that have been soaked up by the bone while it has been buried in the earth.

How big can a land animal be?

I would imagine that an animal the size of *Seismosaurus* (over 30m long and probably weighing as much as 50 tonnes) must be close to the upper limit of any living land animal. When animals reach this size, just moving around and avoiding sudden jolts that might break their bones, can be a real problem.

Could Brachiosaurus stand on its hind legs?

The back legs of *Brachiosaurus* are shorter than its front legs, so it is very hard to tell whether this animal could have reared up on its hind legs or not. I believe that it was possible, but to do so would have been a huge effort, given the weight of its massive chest and front legs. I cannot imagine it just casually rearing up to pluck twigs as shown in the popular film 'Jurassic Park'.



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